

## **CHAPTER 2**

### **DESCRIPTION OF THE LOWER DUCK RIVER WATERSHED**

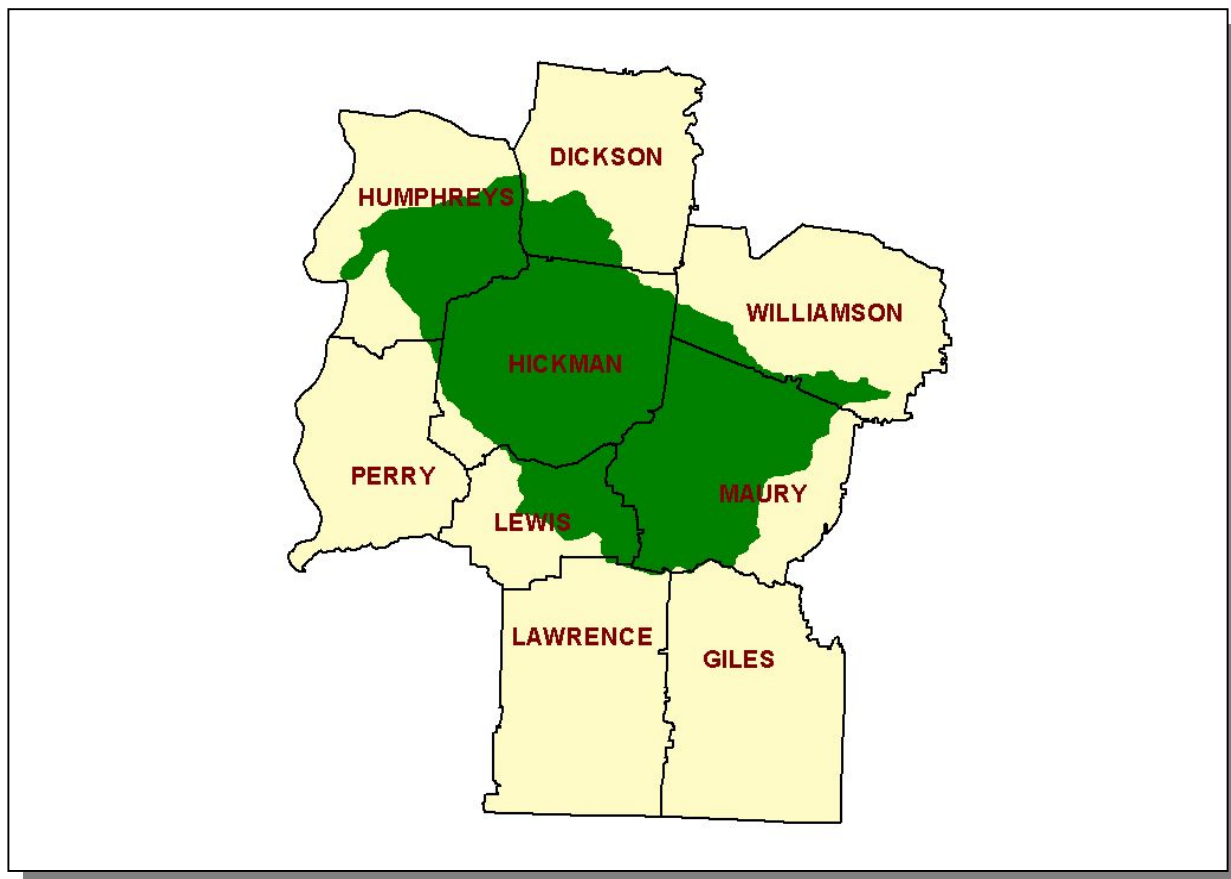
- 2.1. Background**
- 2.2. Description of the Watershed**
  - 2.2.A. General Location**
  - 2.2.B. Population Density Centers**
- 2.3. General Hydrologic Description**
  - 2.3.A. Hydrology**
  - 2.3.B. Dams**
- 2.4. Land Use**
- 2.5. Ecoregions and Reference Streams**
- 2.6. Natural Resources**
  - 2.6.A. Rare Plants and Animals**
  - 2.6.B. Wetlands**
- 2.7. Cultural Resources**
  - 2.7.A. State Scenic River**
  - 2.7.B. Interpretive Areas**
  - 2.7.C. Wildlife Management Area**
- 2.8. Tennessee Rivers Assessment Project**

**2.1. BACKGROUND.** The Duck River was first settled about 8,000 years ago, but its modern name originated from early surveyors who recognized the abundant waterfowl in the Duck River valley. Much of the watershed, especially in the Yanahli area, was considered prime hunting ground by Cherokee and Chickasaw tribes, as well as by the first settlers. The Duck River flows through some of the most scenic landscapes and least populated counties in Tennessee.

This Chapter describes the location and characteristics of the Lower Duck River Watershed.

## 2.2. DESCRIPTION OF THE WATERSHED.

**2.2.A. General Location.** The Lower Duck River Watershed is located in Middle Tennessee and includes parts of Dickson, Giles, Hickman, Humphreys, Lawrence, Lewis, Maury, Perry, and Williamson Counties.

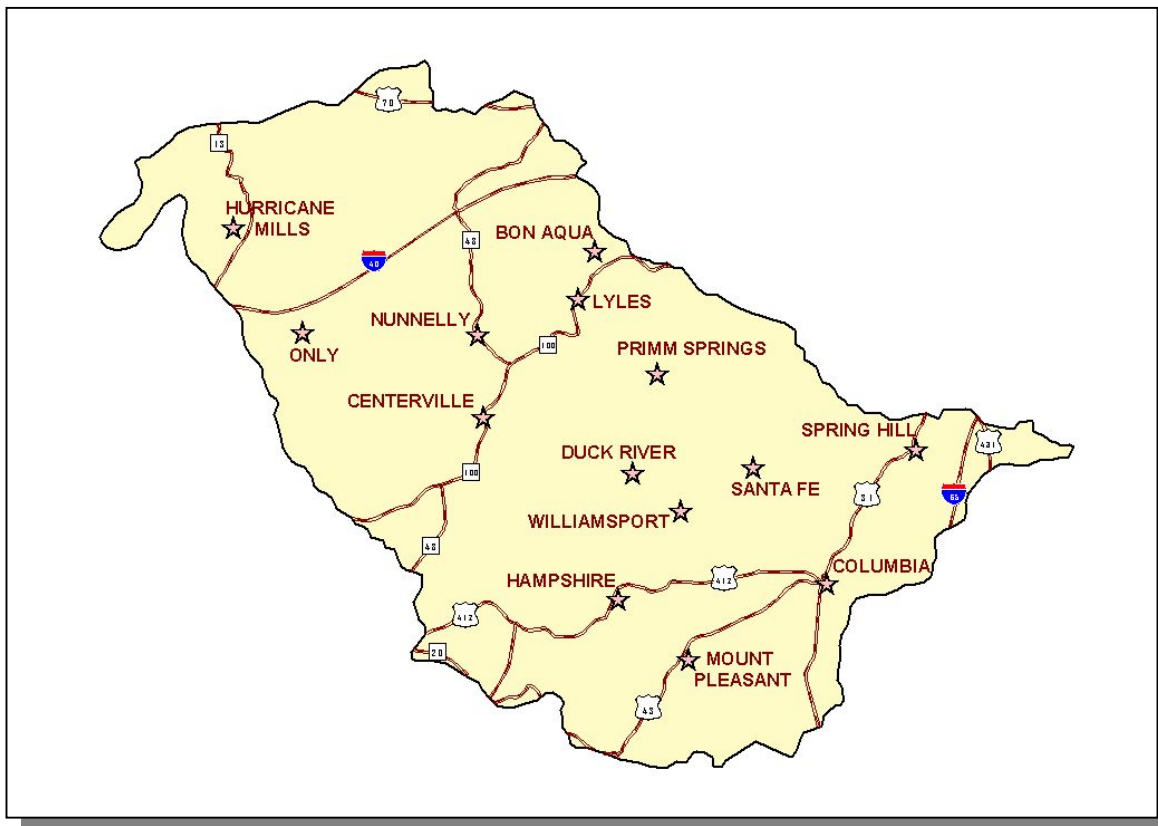


*Figure 2-1. General Location of the Lower Duck River Watershed.*

| COUNTY     | % OF WATERSHED IN EACH COUNTY |
|------------|-------------------------------|
| Hickman    | 36.3                          |
| Maury      | 29.8                          |
| Humphreys  | 15.1                          |
| Lewis      | 8.6                           |
| Dickson    | 5.1                           |
| Williamson | 4.1                           |
| Lawrence   | 0.5                           |
| Giles      | 0.3                           |
| Perry      | 0.2                           |

*Table 2-1. The Lower Duck River Watershed Includes Parts of Nine Middle Tennessee Counties.*

**2.2.B. Population Density Centers.** Nine state highways and two interstates serve the major communities in the Lower Duck River Watershed.



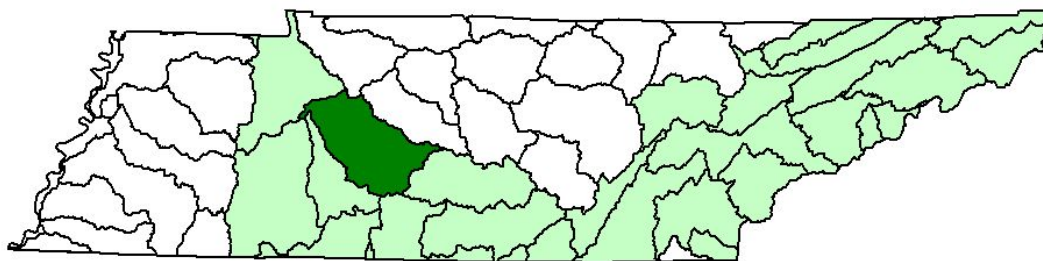
**Figure 2-2. Municipalities and Roads in the Lower Duck River Watershed.**

| MUNICIPALITY   | POPULATION | COUNTY            |
|----------------|------------|-------------------|
| Columbia*      | 32,308     | Maury             |
| Mount Pleasant | 12,058     | Maury             |
| Spring Hill    | 5,968      | Murray/Williamson |
| Centerville*   | 5,045      | Hickman           |

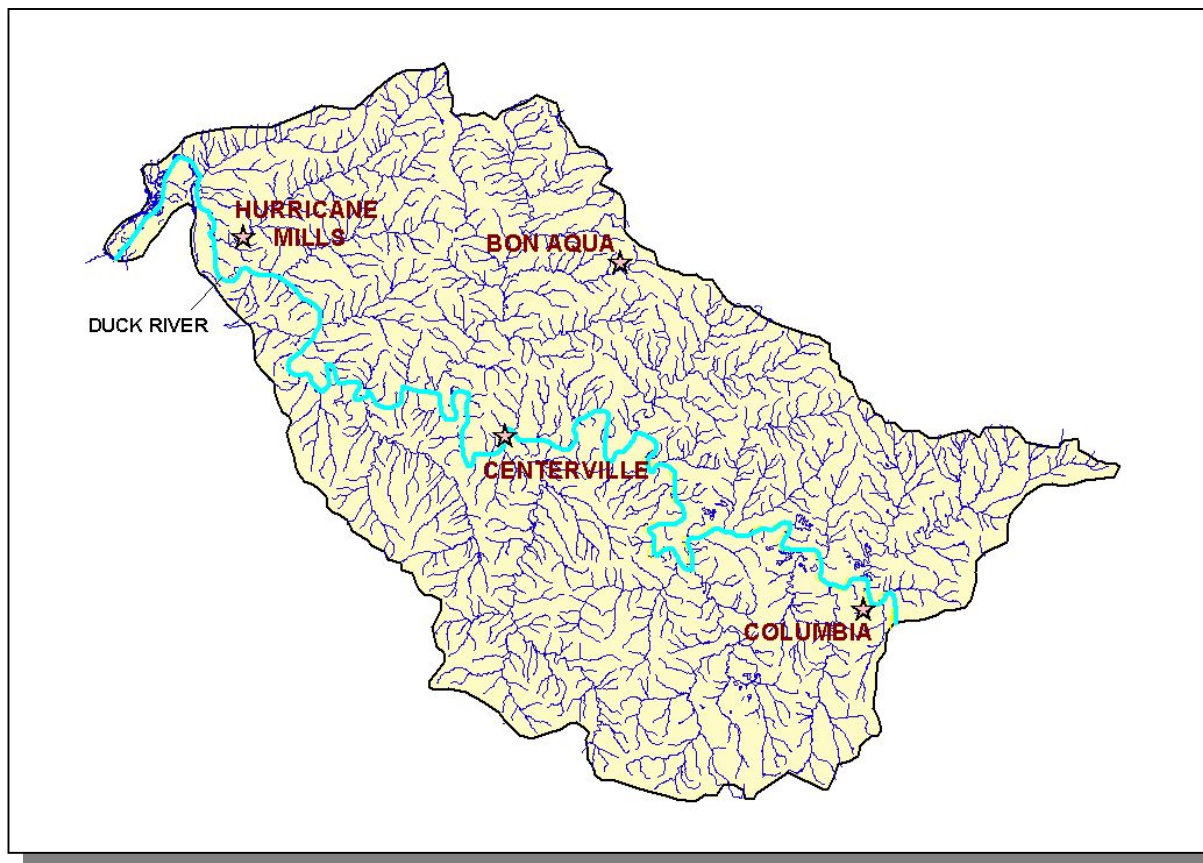
**Table 2-2. Communities and populations in the Lower Duck River Watershed.** Population based on 1999 census (Tennessee 2001/2002 Blue Book). Asterisk (\*) indicates county seat.

## **2.3. GENERAL HYDROLOGIC DESCRIPTION.**

**2.3.A. Hydrology.** The Lower Duck River Watershed, designated 06040003 by the USGS, drains approximately 1,548 square miles and empties to the Tennessee Western Valley (KY Lake) Watershed (06040005).

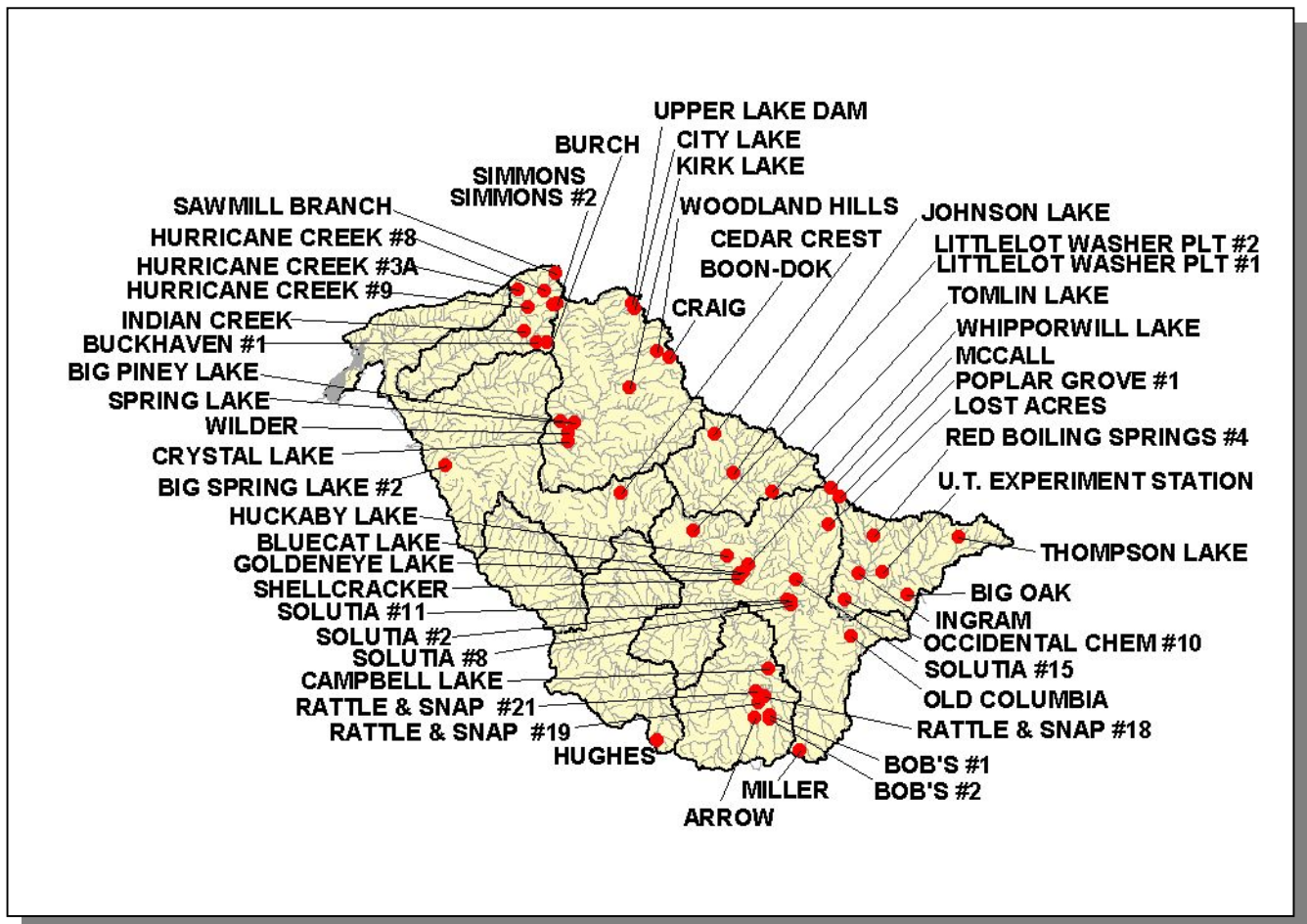


***Figure 2-3. The Lower Duck River Watershed is Part of the Tennessee River Basin.***



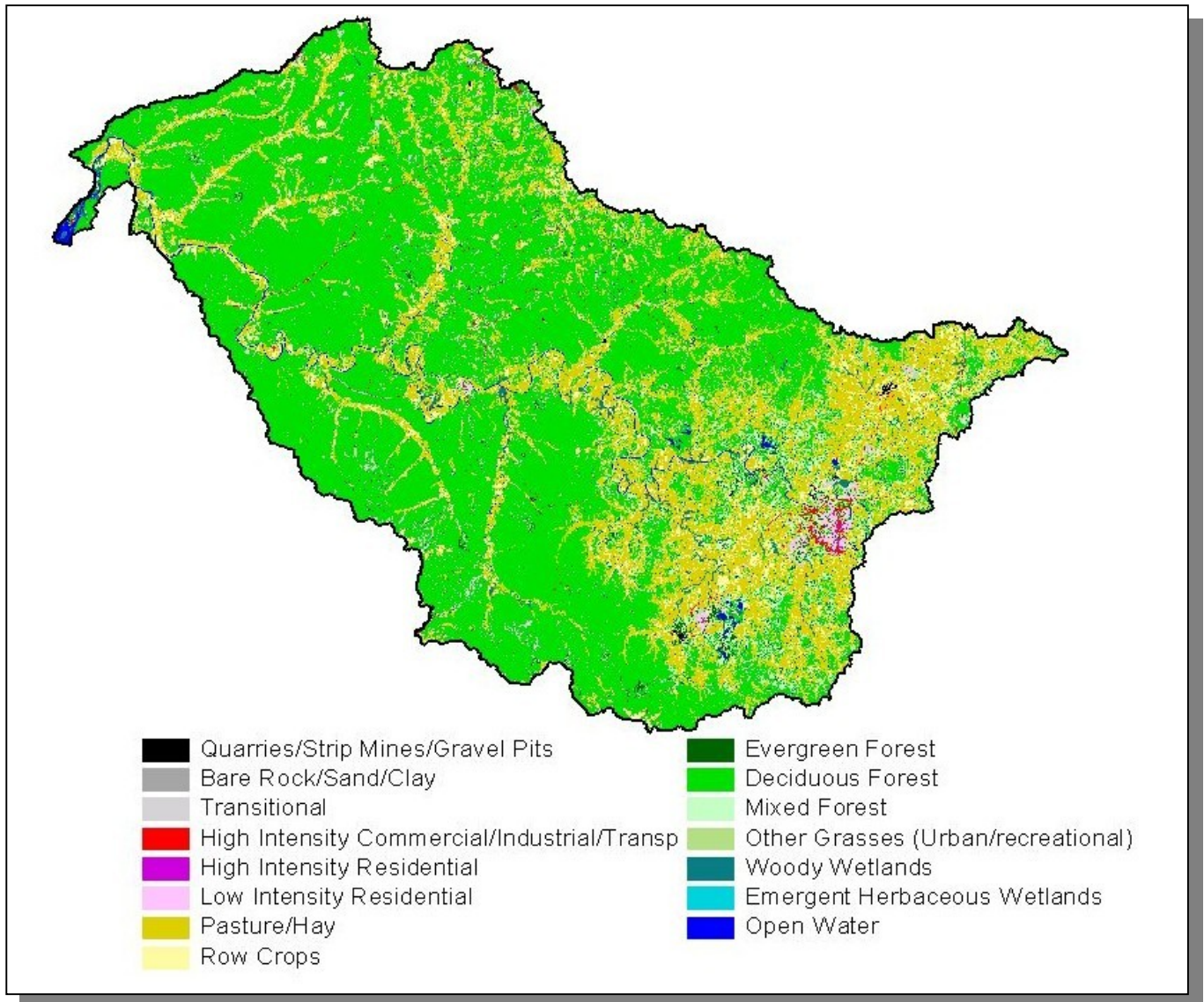
**Figure 2-4. Hydrology in the Lower Duck River Watershed.** There are 2,462 stream miles and 13 lake acres in the Lower Duck River Watershed as catalogued in the assessment database. Location of the Duck River and the cities of Bon Aqua, Centerville, Columbia, and Hurricane Mills are shown for reference.

**2.3.B. Dams.** There are 53 dams inventoried by TDEC Division of Water Supply in the Lower Duck River Watershed. These dams either retain 30 acre-feet of water or have structures at least 20 feet high.

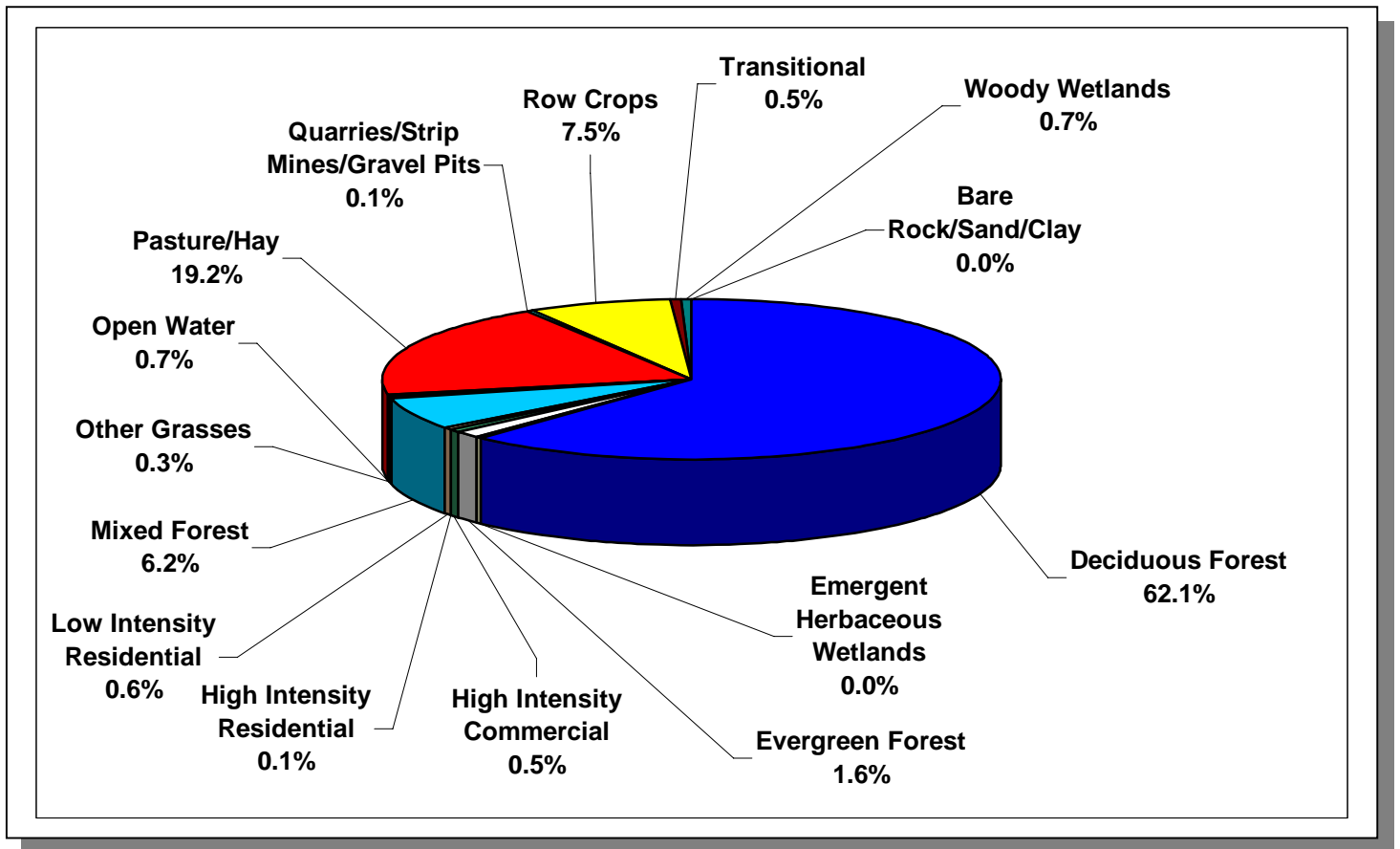


**Figure 2-5. Location of Inventoried Dams in the Lower Duck River Watershed.** More information is provided in Appendix II and on the TDEC homepage at <http://gwidc.memphis.edu/website/dws/>.

**2.4. LAND USE.** Land Use/Land Cover information was provided by EPA Region 4 and was interpreted from 1992 Multi-Resolution Land Cover (MRLC) satellite imagery.

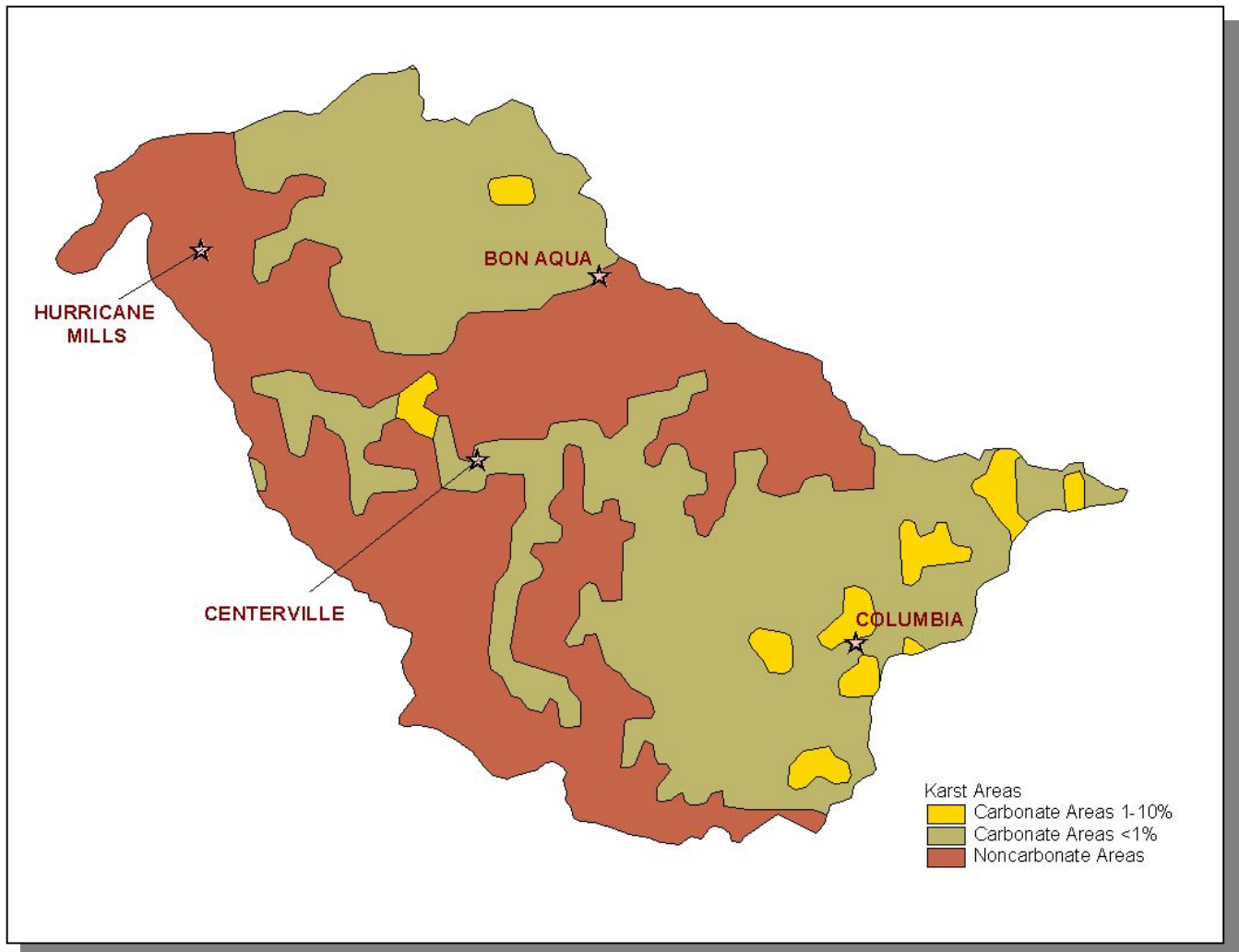


**Figure 2-6. Illustration of Select Land Cover/Land Use Data from MRLC Satellite Imagery in the Lower Duck River Watershed.**



**Figure 2-7. Land Use Distribution in the Lower Duck River Watershed.** More information is provided in Appendix II.

Sinkholes, springs, disappearing streams and caves characterize karst topography. The term “karst” describes a distinctive landform that indicates dissolution of underlying soluble rocks by surface water or ground water. Although commonly associated with limestone and dolomite (carbonate rocks), other highly soluble rocks such as gypsum and rock salt can be sculpted into karst terrain. In karst areas, the ground water flows through solution-enlarged channels, bedding planes and microfractures within the rock. The characteristic landforms of karst regions are: closed depressions of various size and arrangement; disrupted surface drainage; and caves and underground drainage systems. The term “karst” is named after a famous region in the former country of Yugoslavia.



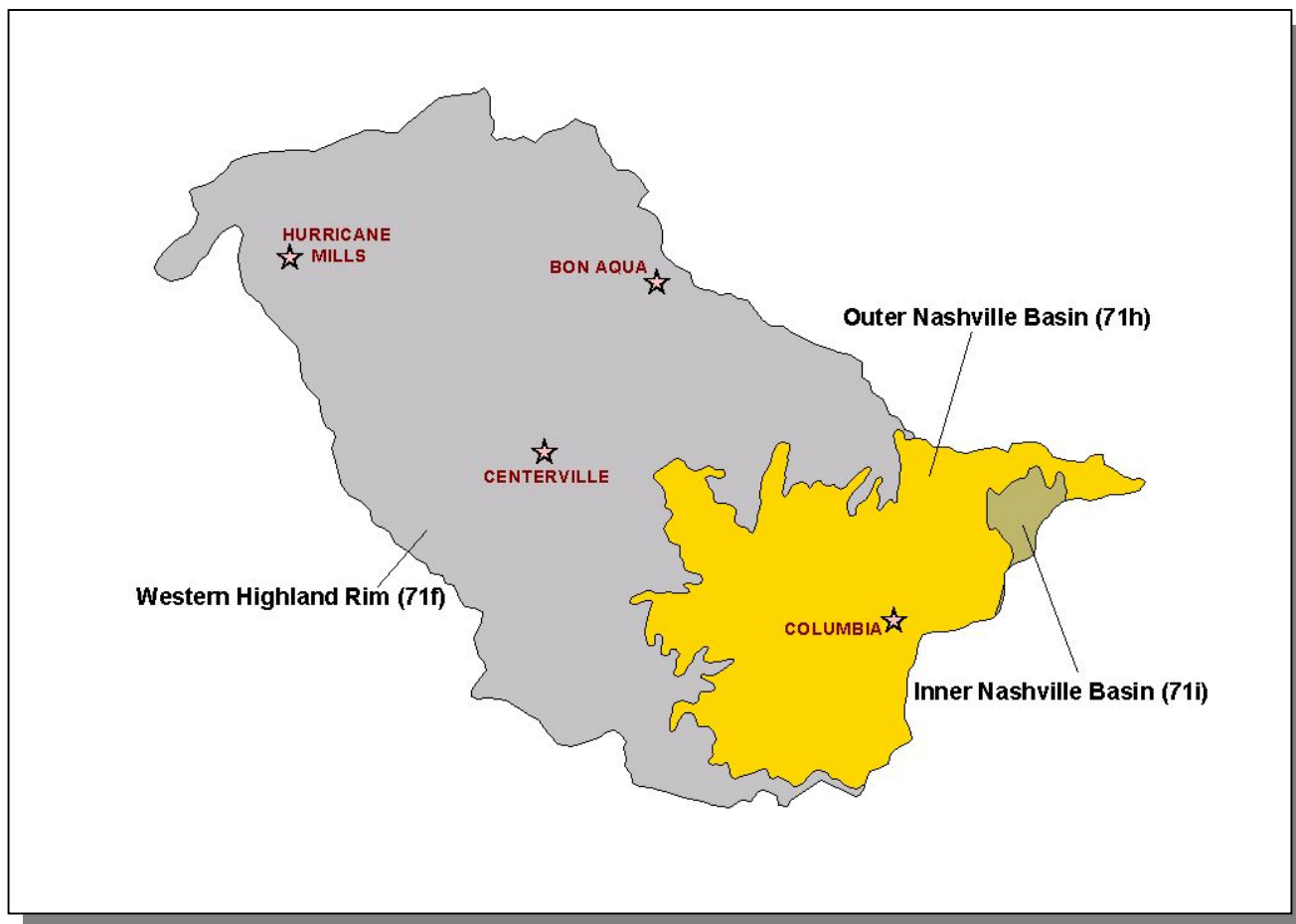
**Figure 2-8. Illustration of Karst Areas in Lower Duck River Watershed.** Locations of Bon Aqua, Centerville, Columbia, and Hurricane Mille are shown for reference.

**2.5. ECOREGIONS AND REFERENCE STREAMS.** Ecoregions are relatively homogeneous areas of similar geography, topography, climate and soils that support similar plant and animal life. Ecoregions serve as a spatial framework for the assessment, management, and monitoring of ecosystems and ecosystem components. Ecoregion studies can aid the selection of regional stream reference sites, identifying high quality waters, and developing ecoregion-specific chemical and biological water quality criteria.

There are eight Level III Ecoregions and twenty-five Level IV subecoregions in Tennessee. The Lower Duck River Watershed lies within a single Level III ecoregion (Interior Plateau) and contains 3 Level IV subecoregions:

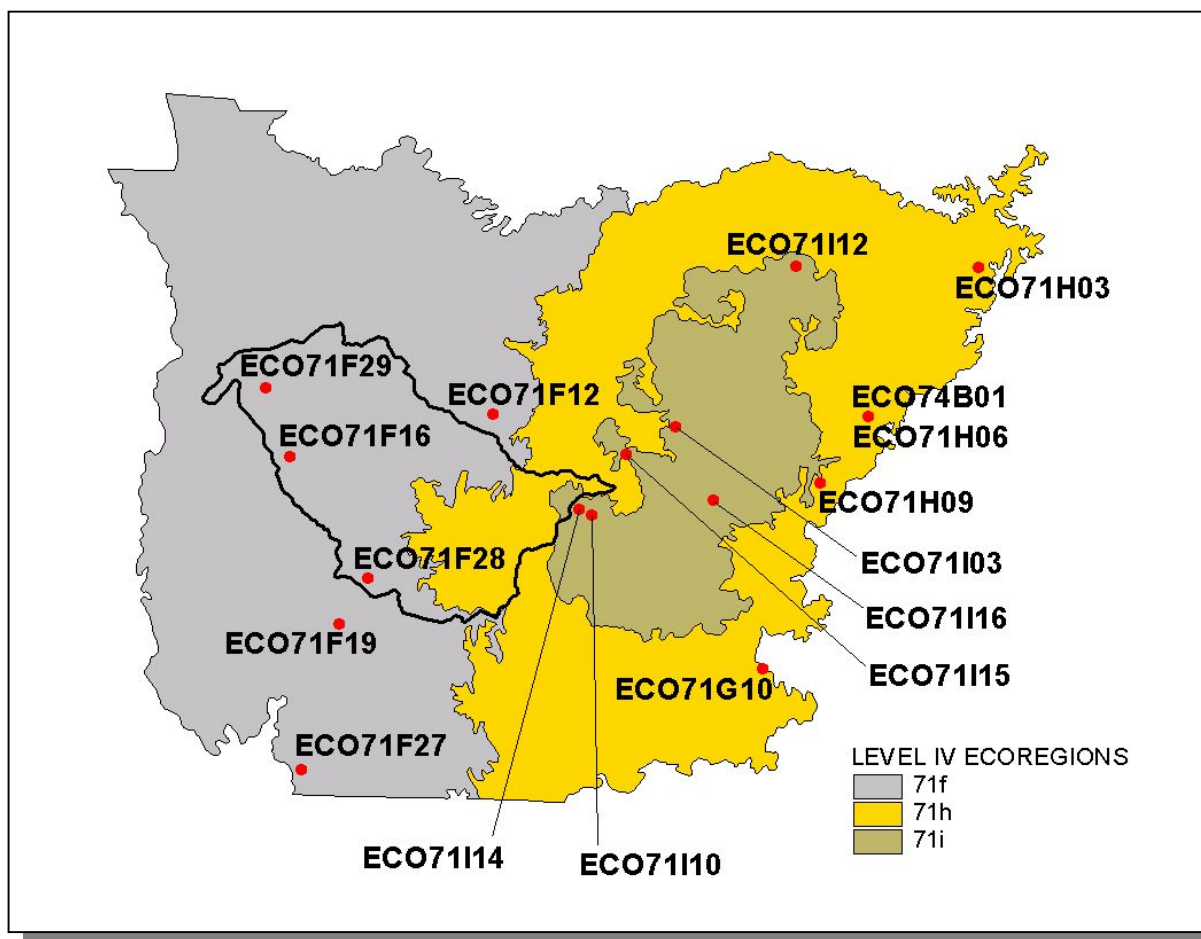
- **Western Highland Rim (71f)** is characterized by dissected, rolling terrain of open hills, with elevations of 400-1000 feet. The geologic base of Mississippian-age limestone, chert, and shale is covered by soils that tend to be cherty and acidic with low to moderate fertility. Streams are relatively clear with a moderate gradient. Substrates are coarse chert, gravel and sand with areas of bedrock. The native oak-hickory forests were removed over broad areas in the mid-to late 1800's in conjunction with the iron-ore related mining and smelting of the mineral limonite, however today the region is again heavily forested. Some agriculture occurs on the flatter interfluves and in the stream and river valleys. The predominant land uses are hay, pasture, and cattle with some cultivation of corn and tobacco.
- **Outer Nashville Basin (71h)** is a more heterogeneous region than the Inner Nashville Basin (71i), with rolling and hilly topography with slightly higher elevations. The region encompasses most of the outer areas of the generally non-cherty Ordovician limestone bedrock. The higher hills and knobs are capped by the more cherty Mississippian-age formation, and some Devonian-age Chattanooga shale, remnants of the Highland Rim. The region's limestone rocks and soils are high in phosphorus, and commercial phosphate is mined. Deciduous forest with pasture and cropland are the dominant land covers. The region has areas of intense urban development with the city of Nashville occupying the northwest region. Streams are low to moderate gradient, with productive, nutrient-rich waters, resulting in algae, rooted vegetation, and occasionally high densities of fish. The Nashville Basin has a distinctive fish population, notable for species that avoid the region, as well as those that are present.
- **Inner Nashville Basin (71i)** is less hilly and lower than the Outer Nashville Basin (71h). Outcrops of the Ordovician-age limestone are common. The generally shallow soils are redder and lower in phosphorous than those of the outer basin. Streams are lower gradient than surrounding regions, often flowing over large expanses of limestone bedrock. The most characteristic hardwoods within the inner basin are a maple-oak-hickory-ash-association. The limestone cedar glades of Tennessee, a unique mixed grassland/forest cedar glades vegetation type with many endemic species, are located primarily on the limestones of the Inner Nashville Basin. The more xeric, open

characteristics and shallow soils of the cedar glades also result in a distinct distribution of amphibian and reptile species. Urban, suburban, and industrial land use in the region is increasing.



**Figure 2-9. Level IV Ecoregions in the Lower Duck River Watershed.** Locations of Bon Aqua, Centerville, Columbia, and Hurricane Mille are shown for reference.

Each Level IV Ecoregion has at least one reference stream associated with it. A reference stream represents a least impacted condition and may not be representative of a pristine condition.



**Figure 2-10. Ecoregion Monitoring Sites in Level IV Ecoregions 71f, 71h, and 71i in Tennessee.** The Lower Duck River Watershed boundary is shown for reference. More information is provided in Appendix II.

## 2.6. NATURAL RESOURCES.

**2.6.A. Rare Plants and Animals.** The Heritage Program in the TDEC Division of Natural Heritage maintains a database of rare species that is shared by partners at The Nature Conservancy, Tennessee Wildlife Resources Agency, the US Fish and Wildlife Service, and the Tennessee Valley Authority. The information is used to: 1) track the occurrence of rare species in order to accomplish the goals of site conservation planning and protection of biological diversity, 2) identify the need for, and status of, recovery plans, and 3) conduct environmental reviews in compliance with the federal Endangered Species Act.

| GROUPING            | NUMBER OF RARE SPECIES |
|---------------------|------------------------|
| Insects and Spiders | 4                      |
| Mussels             | 12                     |
| Snails              | 3                      |
|                     |                        |
| Amphibians          | 1                      |
| Birds               | 4                      |
| Fish                | 13                     |
| Mammals             | 5                      |
| Reptiles            | 3                      |
|                     |                        |
| Plants              | 36                     |
|                     |                        |
| <b>Total</b>        | <b>81</b>              |

**Table 2-3. There are 81 Known Rare Plant and Animal Species in the Lower Duck River Watershed.**

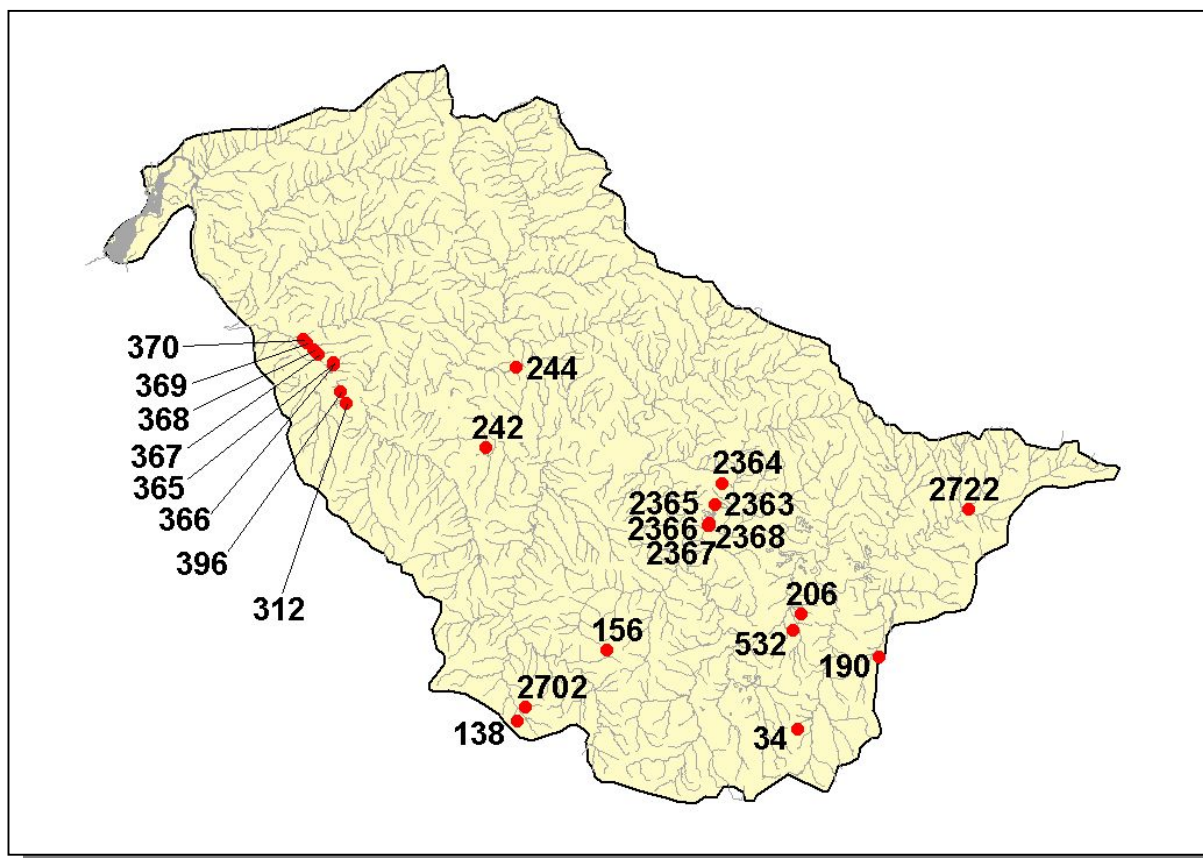
In the Lower Duck River Watershed, there are 13 rare fish species, 11 rare mussel species, and 6 rare snail species.

| SCIENTIFIC NAME                       | COMMON NAME             | FEDERAL STATUS | STATE STATUS |
|---------------------------------------|-------------------------|----------------|--------------|
| <i>Carpionodes velifer</i>            | Highfin Carpsucker      |                | D            |
| <i>Cycleptus elongatus</i>            | Blue Sucker             | MC             | T            |
| <i>Etheostoma denoncourtii</i>        | Golden Darter           |                |              |
| <i>Etheostoma luteovinctum</i>        | Redband Darter          |                | D            |
| <i>Etheostoma pseudovulatum</i>       | Egg-Mimic Darter        | MC             | E            |
| <i>Etheostoma striatulum</i>          | Striated Darter         | MC             | T            |
| <i>Etheostoma aquali</i>              | Coppercheek Darter      | MC             | T            |
| <i>Hemitremia flammea</i>             | Flame Chub              | MC             | D            |
| <i>Ichthyomyzon gagei</i>             | Southern Brook Lamprey  |                | D            |
| <i>Noturus sp 3</i>                   | Saddled Madtom          |                | T            |
| <i>Noturus stanauli</i>               | Pygmy Madtom            | LE             | E            |
| <i>Percina burtoni</i>                | Blotchside Darter       | MC             | D            |
| <i>Percina phoxocephala</i>           | Slenderhead Darter      |                | D            |
|                                       |                         |                |              |
| <i>Conradilla caelata</i>             | Birdwing Pearly Mussel  | LE             | E            |
| <i>Cumberlandia monodonta</i>         | Spectaclecase           |                |              |
| <i>Epioblasma brevidens</i>           | Cumberlandian Combshell | LE             | E            |
| <i>Epioblasma florentina walkeri</i>  | Tan Riffleshell         | LE             | E            |
| <i>Hemistena lata</i>                 | Cracking Pearly Mussel  | LE             | E            |
| <i>Lexingtonia dolabelloides</i>      | Slabside Pearly Mussel  | C              |              |
| <i>Obovaria retusa</i>                | Ring Pink               | LE             | E            |
| <i>Plethobasus cooperianus</i>        | Orange-Foot Pimpleback  | LE             | E            |
| <i>Pleurobema clava</i>               | Clubshell               | LE             | E            |
| <i>Quadrula cylindrica cylindrica</i> | Rabbitsfoot             |                |              |
| <i>Quadrula intermedia</i>            | Cumberland Monkeyface   | LE             | E            |
| <i>Toxolasma cylindrellus</i>         | Pale Lilliput           | LE             | E            |
|                                       |                         |                |              |
| <i>Leptoxis praerosa</i>              | Onyx Rocksnail          |                |              |
| <i>Lithasia duttoniana</i>            | Helmet Rocksnail        |                |              |
| <i>Lithasia geniculata fuliginosa</i> | Geniculate Riversnail   |                |              |
| <i>Lithasia salebrosa</i>             | Rustic Rocksnail        |                |              |

**Table 2-4. Rare Aquatic Species in the Lower Duck River Watershed.** Federal Status: LE, Listed Endangered by the U.S. Fish and Wildlife Service, MC, Management Concern for U.S. Fish and Wildlife Service; C, Candidate species proposed for listing by the U.S. Fish and Wildlife Service. State Status: E, Listed Endangered by the Tennessee Wildlife Resources Agency; T, Listed Threatened by the Tennessee Wildlife Resources Agency; D, Deemed in Need of Management by the Tennessee Wildlife Resources Agency. More information may be found at <http://www.state.tn.us/environment/nh/data.php>.

**2.6.B. Wetlands.** The Division of Natural Heritage maintains a database of wetland records in Tennessee. These records are a compilation of field data from wetland sites inventoried by various state and federal agencies. Maintaining this database is part of Tennessee's Wetland Strategy, which is described at:

<http://www.state.tn.us/environment/nh/wetlands/>

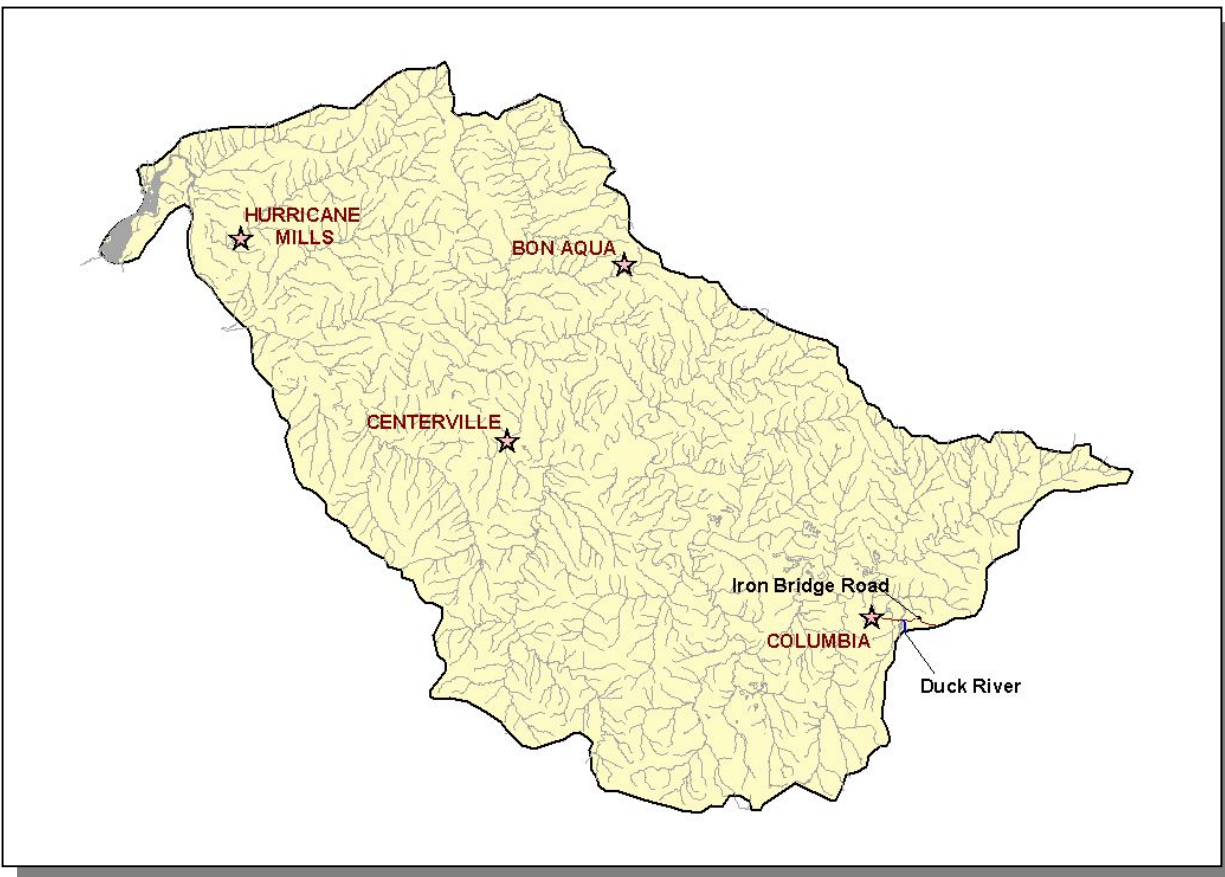


**Figure 2-11. Location of Wetland Sites in TDEC Division of Natural Heritage Database in the Lower Duck River Watershed.** This map represents an incomplete inventory and should not be considered a dependable indicator of the presence of wetlands. More information is provided in Appendix II.

## 2.7. CULTURAL RESOURCES.

**2.7.A. State Scenic River.** A portion of the Lower Duck River has been designated as a State Scenic River. The segment from Iron Bridge Road upstream to the Marshall County line (in the Upper Duck River Watershed) has been designated as a Class II Pastoral River Area. The Tennessee Scenic Rivers Act of 1968, as amended, defines Class II State Scenic Rivers as streams that flow through agricultural areas or lands used for dispersed human activities. More information about Tennessee's State Scenic River Program may be found at:

<http://www.state.tn.us/environment/nh/scenicrivers/>



**Figure 2-12. A Portion of the Lower Duck River is Designated as a State Scenic River.** Locations of Bon Aqua, Centerville, Columbia, and Hurricane Mills are shown for reference.

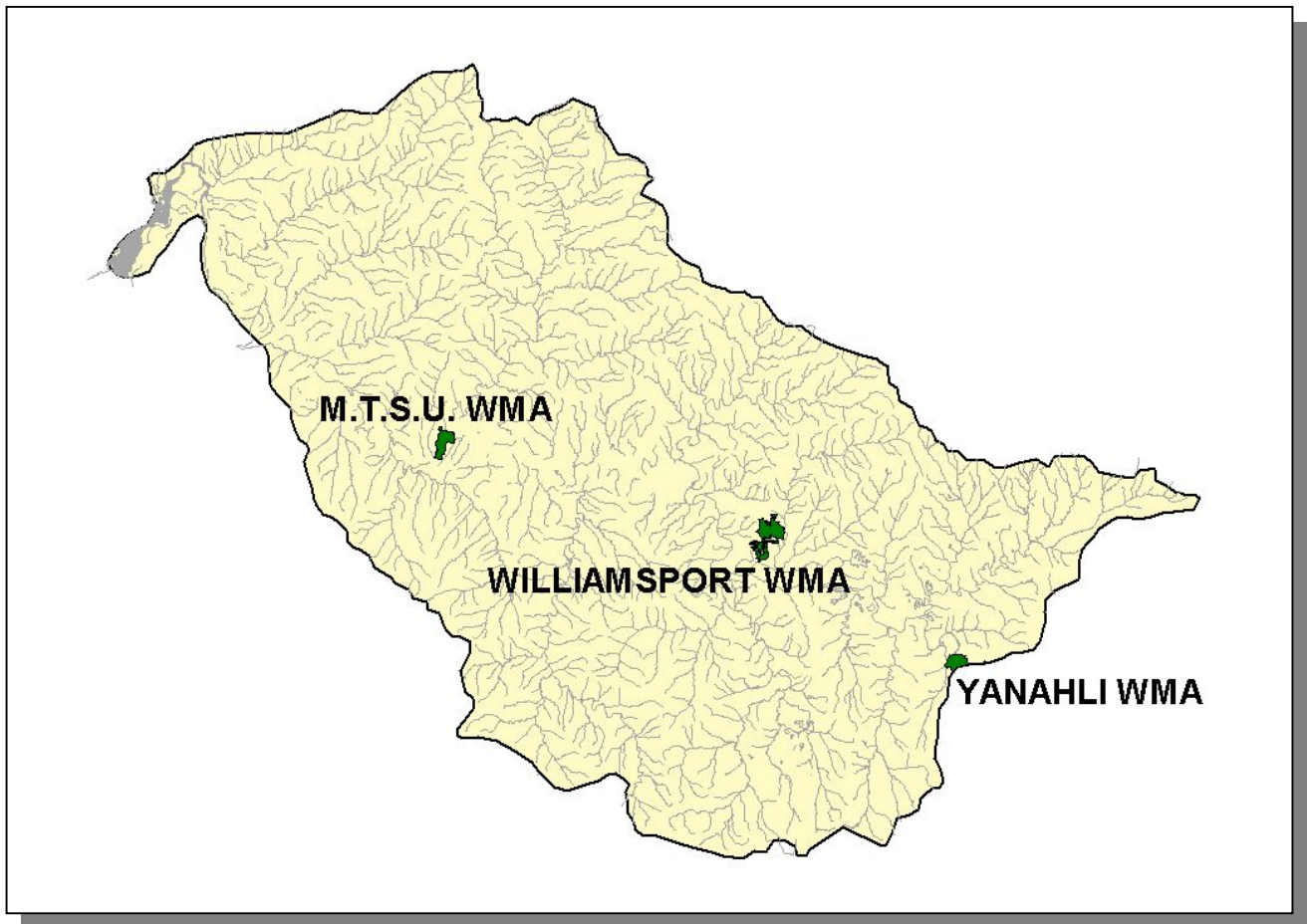
**2.7.B. Interpretive Areas.** Some sites representative of the natural or cultural heritage are under state or federal protection:

- Tennessee NWR-Duck River Unit, established in 1945, is managed by the U.S. Fish and Wildlife Service as an important resting and feeding area for wintering waterfowl as well as migratory birds and resident wildlife. The site is managed by the U.S. Fish and Wildlife Service.
- Link Farm State Archaeological Site in Humphreys County features a prehistoric Mississippian era mound. The site is managed by the state of Tennessee.
- Natchez Trace Parkway National Park commemorates an ancient trail that connected southern portions of the Mississippi River to salt licks in modern-day Tennessee. Between 1785 and 1820, boatmen floated down the Ohio and Mississippi Rivers to Natchez, MS and New Orleans, LA, and walked back to Nashville on the 444-mile Trace. The Park is managed by the National Park Service.



**Figure 2-13. Locations of State- and Federally-Managed Lands in the Lower Duck River Watershed.**

**2.7.C. Wildlife Management Area.** The Tennessee Wildlife Resources Agency manages three wildlife management areas in the Lower Duck River Watershed.



**Figure 2-14. TWRA Manages Wildlife Management Areas in the Lower Duck River Watershed.**

**2.8. Tennessee Rivers Assessment Project.** The Tennessee Rivers Assessment is part of a national program operating under the guidance of the National Park Service's Rivers and Trails Conservation Assistance Program. The Assessment is an inventory of river resources, and should not be confused with "Assessment" as defined by the Environmental Protection Agency. A more complete description can be found in the Tennessee Rivers Assessment Summary Report, which is available from the Department of Environment and Conservation and on the web at:

<http://www.state.tn.us/environment/wpc/publications/riv/>

| STREAM            | NSQ | RB  | RF  |  | STREAM                         | NSQ   | RB | RF  |
|-------------------|-----|-----|-----|--|--------------------------------|-------|----|-----|
| Aenon Creek       | 3   |     |     |  | Hampshire Creek                |       | 3  |     |
| Bear Creek        | 2,3 |     |     |  | Hurricane Creek                | 3     | 3  | 1   |
| Beaver Creek      | 2   |     |     |  | Indian Creek                   | 3     |    |     |
| Beaverdam Creek   | 2   | 2   | 2,3 |  | Isbell Creek                   | 3     |    |     |
| Big Bigby Creek   | 2   | 2   | 3   |  | Knob Creek                     | 3     |    |     |
| Big Spring Creek  | 2   |     |     |  | Leipers Creek                  | 2     | 3  |     |
| Big Swan Creek    | 2   | 1,2 | 2   |  | Lick Creek                     | 2     |    | 2   |
| Blue Buck Creek   | 3   |     |     |  | Little Bigby Creek             | 3     |    | 2   |
| Blue Creek        | 3   | 2   |     |  | Little Swan Creek              | 3     |    | 1   |
| Bluewater Branch  |     |     |     |  |                                |       |    |     |
| Beaver Dam Creek  | 2   |     |     |  | Mill Creek                     | 2     |    | 1   |
| Brushy Fork Creek | 4   |     |     |  | Piney Branch Little Swan Creek | 3     |    |     |
| Carters Creek     | 3   |     |     |  | Piney River                    | 1,2,3 | 2  | 2,3 |
| Catheys Creek     | 3   |     |     |  | Quality Creek                  | 3     |    |     |
| Coon Creek        | 3   |     |     |  | Rutherford Creek               | 3     | 3  | 2   |
| Dry Creek         |     |     | 2   |  | Scotts Creek                   | 2     |    |     |
| Duck River        | 2,3 | 2   | 2,3 |  | Snow Creek                     | 2     |    |     |
| East Fork         |     |     |     |  |                                |       |    |     |
| Greenlick Creek   | 3   |     |     |  | Sugar Creek                    | 2,3   | 3  |     |
| East Piney River  | 2   |     |     |  | Sulphur Fork Tumbling Creek    | 2     | 2  | 1   |
| Garner Creek      | 2   |     |     |  | Turkey Creek                   | 2     |    |     |
| Gin Branch        |     |     |     |  |                                |       |    |     |
| Greenlick Creek   | 3   |     |     |  | Wades Branch Beaverdam Creek   | 3     |    |     |
| Greenlick Creek   | 3   |     |     |  | West Fork Bigby Creek          | 3     |    |     |

**Table 2-5. Stream Scoring from the Tennessee Rivers Assessment Project in the Lower Duck River Watershed.**

Categories: NSQ, Natural and Scenic Qualities  
RB, Recreational Boating  
RF, Recreational Fishing

Scores: 1. Statewide or greater Significance; Excellent Fishery  
2. Regional Significance; Good Fishery  
3. Local Significance; Fair Fishery  
4. Not a significant Resource; Not Assessed